

The state of the ionosphere ...

S/874/62/000/002/009/019
D218/D308

Strong ionospheric storms were associated with a decrease in the ionization density and in the critical frequencies. There are 15 figures and 2 tables.

Card 3/3

18

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APPARATUS FOR EXTRACTING SODIUM SULFATE FROM THE MELT. B. V. PUSTOVOIT AND
S. N. KUKOV. Russ 21361, Oct 31, 1931. Structural details

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

18

KULIKOV, N. N.

PHASE X

TREASURE ISLAND BIBLIOGRAPHICAL REPORT

AID 76 -- X

(Supersedes AID 76 - I)

BOOK

Call No.: QC587.E4

Authors: BEDOV, D. G., VINOGRADOV, V. A. and KULIKOV, N. N., Engs.

Full Title: CONSTRUCTION TECHNIQUES OF MASS PRODUCTION OF MICA AND PAPER CAPACITORS

Transliterated Title: Tekhnologiya massovogo izgotovleniya slyudyanykh i bumazhnykh kondensatorov

PUBLISHING DATA

Originating Agency: None

Publishing House: State Power Engineering Publishing House

Date: 1951

No. pp.: 196

No. of copies: 4,000

Editorial Staff

The Introduction, ch. 1, 2, 4, and section 50 were written by N. N. Kulikov; ch. 3 by V. A. Vinogradov; and ch. 5 by D. G. Bedov.

PURPOSE AND EVALUATION: The book is written as a practical manual for foremen, technicians and workers of capacitor Plants. It may also serve as a textbook for students of special technical schools or in training and qualifying courses. There is no similar book in the English language. The closest to it from the point of view of its practical approach seems to be the book Capacitors- Their Use in Electronic Circuits by M. Brotherton

KULIKOV, N.N.

Characteristics of TNKH-L coring tubes, based on the studies of
the Barents and Kara Seas carried out in 1958. Inform. biul. NIIGA
no.2:66-71 '58. (MIRA 12:10)
(Barents Sea--Geological specimens--Collection and preservation)
(Kara Sea--Geological specimens--Collection and preservation)

KULIKOV, N.N.

Using Moldavian clays as aggregates in making lightweight building
products. Stroi. mat. 5 no.10:35 0 '59. (MIRA 13:2)
(Moldavia--Clay)

SHUR, A.M.; KULIKOV, N.N., red.; SHOYMER, A., otv. za vypusk;
TEL'PIS, V., tekhn.red.

[Polymers for the national economy of Moldavia] Polimery dlia
narodnogo khoziaistva Moldavii. Kishinev, Gos.izd-vo "Kartia
Moldoveniaska," 1960. 106 p. (MIRA 14:3)
(Moldavia--Polymers)

KULIKOV, N.N.; POLYAKOV, V.Ye.

Polymer-gypsum made with phenolfurfurcle resin. Stroi. mat. 6 no.11:
22 N '60. (MIRA 13:11)
(Gypsum)

16.3500

26504
S/044/61/000/004/016/033
C111/C222

AUTHOR: Kulikov, N.P.

TITLE: Boundary value problems for some systems of linear differential equations of parabolic type

PERIODICAL: Referativnyy zhurnal. Matematika, no. 4, 1961, 51, abstract 4 B 255. ("Uch zap. Balashovsk. gos.ped.in-t", 1958, 3, 35-46) X

TEXT: In the strip $0 \leq x \leq 1$ of the (x, t) -plane the author considers the parabolic system

$$Lu = \frac{\partial u}{\partial t} + F(x, t), \quad (1)$$

where L is a linear differential expression of n -th order in the variable, the matrix coefficients of which depend only on x . The author gives the conditions for the correct solvability of the problem without initial conditions for (1) for the boundary conditions

$$\sum_{j=0}^{n-1} a_{\nu j} \frac{\partial^j u(0, t)}{\partial x^j} + \sum_{j=0}^{n-1} b_{\nu j} \frac{\partial^j u(1, t)}{\partial x^j} = f_{\nu}(t) \quad (2)$$

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$$(\nu = 1, 2, \dots, n, -\infty < t < +\infty),$$

Boundary value problems for some ...

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where $a_{y,j}$ and $b_{y,j}$ are constant matrices of m -th order, as well as
for the mixed problem : (1), (2) for $t > 0$ and the initial condition
 $u(x,0) = f(x)$, $x \in [0,1]$.
There are many misprints.

[Abstracter's note : Complete translation.]

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C111/C222

16.3500

AUTHOR: Kulikov, N.P.

TITLE: On some boundary value problems for the equation
 $\partial u / \partial t = \Delta u + F$

PERIODICAL: Referativnyy zhurnal. Matematika, no.3, 1960,82,
abstract 3038 (Uch. zap. Balashovsk. gos.ped.in-ta, 1958,
3, 149-164)

TEXT: For the equation

$$\partial u / \partial t = \Delta u + F(p, t) \quad (1)$$

the author considers the following boundary value problems: Let D be a finite region of the three-dimensional Euclidean space which is bounded by the surface Σ ; let T be the cylinder $[p \in D] \times [t \in (-\infty, \infty)]$, T^+ be the semicylinder $[p \in D] \times [t \in (0, \infty)]$, Σ_T , Σ_{T^+} be their lateral faces.

The boundary value problem without an initial condition consists in the determination of a solution of (1) in T which satisfies the condition

$$u|_{\Sigma_T} = f(\xi, t), \quad \xi \in \Sigma.$$

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On some boundary value problems...

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The determination of a solution of (1) in T^+ satisfying the conditions

$$u|_{S_T^+} = f(\sigma, t), \quad \sigma \in S, \quad t \geq 0$$

$$u(P, 0) = \varphi(P), \quad P \in D$$

is called a mixed boundary value problem. The solutions shall apparently be understood in the generalized sense. Under certain conditions of smoothness for the functions F, f, φ and the boundary S the author proves the existence and uniqueness of the solution of the second problem in the class $C^{(1)}(T^+)$ and the existence of the solution of the first problem in the class $C^{(1)}(T)$. It is shown that the difference of two solutions of the latter problem belonging to $C^{(1)}(T)$ which for any real λ satisfy the condition

$$|u(P, t)| e^{-\lambda t} \rightarrow 0 \quad \begin{array}{l} \text{for } t \rightarrow \infty \text{ if } \lambda > 0 \\ \text{for } t \rightarrow -\infty \text{ if } \lambda < 0, \end{array}$$

belongs to a finite-dimensional subspace in the $C^{(1)}(T)$ which depends on λ and is generated with the aid of the eigenfunctions of the

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boundary value problem $\Delta \varphi = \lambda \varphi$, $\varphi|_S = 0$.
For the investigation of the boundary value problem without an initial condition the function $u(P, t)$ is Fourier-transformed in t , and the Dirichlet and the Neumann boundary value problem are investigated for the equation $\Delta u = i\alpha u$, where α is real. According to a statement of the paper, their solutions have a number of properties being analogous to the properties of the harmonic functions.
[Abstracter's note: Complete translation.]

X

Card 3/3

KULIKOV, N. P., Candidate Phys-Math Sci (diss) -- "On marginal problems for certain systems of linear differential equations of parabolic type". Saratov, 1959. 5 pp (Saratov State U im N. G. Chernyshevskiy, Chair of Math Analysis), 100 copies (KL, No 22, 1959, 108)

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16.3800

C111/C222

AUTHOR: Kulikov, N.P.

TITLE: On Inner Boundary Value Problems Without an Initial Condition
for the Equation $\Delta u = \frac{\partial u}{\partial t} + qu + F$

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, 1960,
No. 6, pp. 140 - 149.

TEXT: Let D be a finite spatial region with the boundary S ; let T be
a cylinder with the base D the directrices of which are parallel to the
t-axis, let Γ be the lateral area of T. The author considers

$$(1) \quad \Delta u = \frac{\partial u}{\partial t} + qu + F(P, t),$$

where Δ is the Laplace operator, $q = \text{const}$, $F(P, t)$ is a function defined
for $P \in D$, $-\infty < t < \infty$. For (1) the author gives the Dirichlet problem

$$(2) \quad \begin{aligned} u|_{\Gamma} &= f(\sigma, t) \\ (\sigma \in S, -\infty < t < +\infty) \end{aligned},$$

and the Neumann problem

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On Inner Boundary Value Problems Without an Initial Condition for the

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$$(3) \quad \left. \frac{\partial u}{\partial n} \right|_{\Gamma} = f(\sigma, t) \\ (\sigma \in S, -\infty < t < +\infty),$$

$$(4) \quad \left[\frac{\partial u}{\partial n} + h(\sigma)u \right]_{\Gamma} = f(\sigma, t) \\ (\sigma \in S, -\infty < t < +\infty)]$$

where $f(\sigma, t)$ is a given function, $\frac{\partial}{\partial n}$ is the derivative with respect to the outer normal of S .

Let D_k be the k -th derivative with respect to the space coordinates. Let

$\mu \in H[A_0(\alpha), A_1(\alpha), \dots, A_k(\alpha), \lambda]$ in D if $\mu(P, \alpha)$ has bounded continuous derivatives in D : $|D_n \mu| \leq A_n(\alpha)$, $n = 0, 1, \dots, k$, and if D_k is

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is regularly continuous in D : $|D_k \mu(P'', \alpha) - D_k \mu(P', \alpha)| \leq A_k(\alpha) r^\lambda$,
where $A_n(\alpha)$ and λ are independent of the choice of the P'' and P' in D .
The class $H[A_0(\alpha), A_1(\alpha), \dots, A_k(\alpha), \lambda]$ on S is introduced as in
(Ref. 1). Let $\mu \in C^{(k)}[A_0(\alpha)]$ in D if $\mu(P, \alpha)$ has continuous
derivatives up to the order k in D , and $|D_n \mu| \leq A_0(\alpha)$, $n = 0, \dots, k$, where
 $A_0(\alpha)$ does not depend on P . Let $F \in L$ if the Fourier transform of F belongs
to $C^{(1)}[c_0(|\alpha| + 1)^{-1-\delta}]$ in D . \tilde{L} denotes the space of functions
 $f(\sigma, t)$ the Fourier transforms of which belong to $H[c_0(|\alpha| + 1)^{-2-\delta},$
 $c_1(|\alpha| + 1)^{-1-\delta}, \lambda]$ on S in the case of the Dirichlet problem and to
 $H[c_0(|\alpha| + 1)^{-3/2-\delta}, \lambda]$ on S in the case of the Neumann problem, where
 c_1, δ are positive constants. Let $u(P, t) \in A_\lambda$ if $u(P, t)$ has continuous
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$$\text{Equation } \Delta u = \frac{\partial u}{\partial t} + qu + F$$

first derivatives with respect to all variables in T , and for $t \rightarrow +\infty$ ($t \rightarrow -\infty$),

$\lambda > 0$ ($\lambda < 0$) it holds uniformly in $P \in D$: $n(P, t)e^{-\lambda t} \rightarrow 0$.

In the case (2) and (4) let $\text{Re } q \gg 0$, in the case (3) let $\text{Re } q > 0$. Let the function $h(\sigma) \geq 0$ be continuous on S . Let the region D be simply connected, and let S satisfy the conditions of A.M. Lyapunov.

Given the equation $\Delta u = (i\alpha + q)u$ with the singular solution $\frac{1}{r} e^{-\sqrt{i\alpha + q}r}$;

let $\sqrt{i\alpha + q}$ be chosen so that $\text{Re}(\sqrt{i\alpha + q}) \gg 0$.

Let the oscillation potentials be introduced by

$$(1.1) \quad v[\mu] = \int_S \mu \frac{e^{-\sqrt{i\alpha + q}r}}{r} d\sigma$$

$$(1.2) \quad w[\mu] = \int_S \frac{\partial}{\partial n} \frac{e^{-\sqrt{i\alpha + q}r}}{r} d\sigma$$

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On Inner Boundary Value Problems Without an Initial Condition for the

Equation $\Delta u = \frac{\partial u}{\partial t} + qu + F$

and the volume potential by

$$(1.3) \quad P[\mu] = \int_D \mu \frac{e^{-\sqrt{1+q}r}}{r} dv.$$

Let $\mathcal{J}_k(B, \lambda)$ be defined as in (Ref. 1, p. 118 - 120).

Theorem 1.1 : If $S \in \mathcal{J}_{k+1}(B, \lambda)$ and $\mu \in H[A_0(\alpha), A_1(\alpha), \dots, A_k(\alpha), \lambda]$ on S then $V[\mu]$ has regularly continuous derivatives of $(k+1)$ -st order in D_i and D_e and it holds

$$(1.4) \quad |D_n V[\mu]| \leq c_n \sum_{i=0}^n A_i(\alpha)(|\alpha| + 1)^{\frac{n-i-1}{2}}, \quad A_{k+1}(\alpha) = A_k(\alpha)$$

(n = 0, 1, 2, ..., k + 1) .

Theorem 1.2 : If $S \in \mathcal{J}_{k+1}(B, \lambda)$ and $\mu \in H[A_0(\alpha), A_1(\alpha), \dots, A_k(\alpha), \lambda]$

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on S then $W[\mu]$ has regularly continuous derivatives of the order k in
 D_i and D_e and it holds

$$|D_n W[\mu]| \leq c_n \sum_{i=0}^n A_i(\alpha) (|\alpha| + 1)^{\frac{n-i}{2}} \quad (1.5)$$

$(n = 0, 1, 2, \dots, k)$

Theorem 1.3: If $S \in \mathcal{J}_{k+1}(B, \lambda)$ and $\mu \in C^k[A_0(\alpha)]$ in D_i then inside
 D_i , $P[\mu]$ has continuous derivatives of the order $k + 1$ and in D_i and D_e
it holds

$$|D_n P[\mu]| \leq c_n A_0(\alpha) (|\alpha| + 1)^{\frac{n-2}{2}} \quad (1.10)$$

$(n = 0, 1, 2, \dots, k)$

while inside D_i it holds

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On Inner Boundary Value Problems Without an Initial Condition for the
Equation $\Delta u = \frac{\partial u}{\partial t} + qu + F$

$$(1.11) \quad |D_{k+1}P[\mu]| \leq c_{k+1}A_0(\alpha)(|\alpha| + 1)^{\frac{k-1}{2}}$$

The author considers the equation

$$(2.1) \quad \Delta u = (i\alpha + q)u + E(P, \alpha)$$

and the boundary conditions

$$(2.2) \quad u|_S = f(\sigma, \alpha) ,$$

$$(2.3) \quad \frac{\partial u}{\partial n}|_S = f(\sigma, \alpha) ,$$

$$(2.4) \quad \frac{\partial u}{\partial n} + h(\sigma)u|_S = f(\sigma, \alpha) ,$$

where $E(P, \alpha)$, $f(\sigma, \alpha)$ are given functions.
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On Inner Boundary Value Problems Without an Initial Condition for the

$$\text{Equation } \Delta u = \frac{\partial u}{\partial t} + qu + F$$

Let especially

$$(2.5) \quad \Delta u = (1\alpha + q)u$$

be the homogeneous equation corresponding to (2.1).

Let D' be a region lying in D together with its boundary, let d be the distance of the boundary of D' from S .

Theorem 2.1 : If $f \in H[A_0(\alpha), \lambda]$ on S then (2.5)-(2.3) has a unique solution, and it holds

$$(2.6) \quad |D_k u| \leq c_k A_0(\alpha) (|\alpha| + 1)^{\frac{k-1}{2}}$$

$$(k = 0, 1)$$

in D and

$$(2.7) \quad |D_k u| \leq c_k A_0(\alpha) (|\alpha| + 1)^{\frac{k-1}{2}} e^{-\frac{\sqrt{2|\alpha|}}{2} d}$$

$$(k = 0, 1, 2, \dots)$$

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On Inner Boundary Value Problems Without an Initial Condition for the
Equation $\Delta u = \frac{\partial u}{\partial t} + qu + F$

in D' .

Theorem 2.2 : If $f \in H[A_0(\alpha), A_1(\alpha), \lambda]$ on S then (2.5)-(2.3) has a
single solution for which in D it holds

$$(2.9) \quad |u| \leq |f|, \quad |D_1 u| \leq c_1 [A_1(\alpha) + (|\alpha| + 1)^{\frac{1}{2}} A_0(\alpha)]$$

and in D' it holds

$$(2.10) \quad |D_k u| \leq c_k A_0(\alpha) (|\alpha| + 1)^{\frac{k}{2}} e^{-\frac{\sqrt{2|\alpha|}}{2} d} \quad (k = 0, 1, 2, \dots)$$

Theorem 2.3 : If $f \in H[A_0(\alpha), \lambda]$ on S then (2.5) - (2.4) has a single
solution for which the estimations (2.6)-(2.7) are valid.

Theorem 2.4 : If $E \in {}^{(1)}[A_0(\alpha)]$ in D_1 then there exist unique solutions
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On Inner Boundary Value Problems Without an Initial Condition for the
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of (2.1) with homogeneous boundary conditions (2.2)-(2.4) and for them
there hold the estimations

$$(2.12) \quad |D_k u| \leq c_0 (|\alpha| + 1)^{\frac{k-2}{2}} \Lambda_0(\alpha) \quad (k = 0, 1)$$

in D and

$$(2.13) \quad |D_2 u| \leq c_0 \Lambda_0(\alpha)$$

in D' .

For the boundary value problems (2), (3), (4) for (1) it is proved :
Theorem 3.1 : If $F \in L$ and $f \in \tilde{L}$ then for every boundary value problem
there exists a bounded solution being continuous in T together with the
first derivatives with respect to all variables, and having continuous
second derivatives with respect to x, y, z in the interior of T .
In theorem 3.2, for the homogeneous equation

$$(3.1) \quad \Delta u = \frac{\partial u}{\partial t} + qu$$

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Equation $\Delta u = \frac{\partial u}{\partial t} + qu + F$

the mixed problem with the initial condition $u(P,0) = \varphi(P)$ ($P \in D$) and one of the boundary conditions (2)-(4) is considered. It is stated that if $\varphi(P)$ has continuous second derivatives in D , and if it satisfies the corresponding homogeneous boundary condition then the given mixed problem has a unique solution being continuous in T for $t \geq 0$ and having continuous first derivatives in T for $t > 0$, while in the interior of T there exist continuous second derivatives with respect to the coordinates of P .

Since the eigenvalues of the boundary value problems for $\Delta \varphi = \lambda \varphi$ with the homogeneous boundary conditions (2)-(4) have no finite accumulation points, only the following cases are possible for a fixed λ :

1) $\lambda_1 - \operatorname{Re} q \leq \lambda$,

2) it exists a natural number $s \geq 1$ so that $\lambda_{s+1} - \operatorname{Re} q \leq \lambda < \lambda_s - \operatorname{Re} q$.

In the second case the functions

$\varphi_1(P)e^{(\lambda_1 - q)t}$, $\varphi_1(P)e^{(\lambda_2 - q)t}$, ..., $\varphi_s(P)e^{(\lambda_s - q)t}$

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form a subspace B_λ in the space A_λ .

Theorem 3.3 : If $F \in L$, $f \in \tilde{L}$ and $s \geq 1$ then the difference of two arbitrary solutions of each boundary value problem without initial conditions in the space A_λ belongs to the subspace E_λ .

The author mentions N.M. Gyunter. There are 4 Soviet references.

[Abstracter's note : The definitions of $H[A_0(\alpha)A_1(\alpha), \dots, A_k(\alpha), \lambda]$;

$\bigcap_k(B, \lambda)$; D_e and D_1 are not given in the paper. (Ref. 1) concerns

N.M. Gyunter, Potential Theory and its Application to Basic Problems of Mathematical Physics].

ASSOCIATION: Balashovskiy pedagogicheskiy institut
(Balashov Pedagogical Institute)

SUBMITTED: December 7, 1958

Card 12/12

KULIKOV, N.P.: RUBINSHTKYN, S.I.

Reconstruction of blast furnaces with an increase in their working
volume. Stal' 24 no.7:593-595 J1 '64.

(MIRA 18:1)

KULIKOV, N.P.

A problem without initial conditions. Uch. zap. Bal. gos. ped.
inst. 10:20-31 '63. (MIRA 18:10)

KULIKOV, N.P.

Uniqueness of the solutions to problems without initial con-
ditions. Uch. zap. Bal. gos. ped. inst. 10:32-40 '63.
(MIRA 18:10)

KULIKOV, N. S., (Candidate of Veterinary Sciences, Scientific
Research Institute of Apiculture.)

The new in treatment of the European foul brood of bees
Veterinariya, Vol. 3, No. 7, July 1961 p. 51.

AKRAMOVSKII, M. N. and KULIKOV, N. S. (Candidates of Veterinary Sciences, Grodno Oblast Veterinary Bacteriological Laboratory)

"Treatment of the European foul brood of bees by a culture of microbe antagonists"

Veterinariya, vol. 39, no. 7, July 1962 pp. 58

KULIKOV, N.S., kand. veterinarnykh nauk; AKRAMOVSKIY, M.N., kand. veterinarnykh nauk; SHCHEKIN, Ye.D.

Antibiotics against European foul brood. Veterinariia 40
no.4:56-57 Ap '63. (MIRA 17:1)

1. Institut pchelovodstva Ministerstva proizvodstva i zago-
tovok sel'skokhozyaystvennykh produktov RSFSR (for Kulikov,
Akramovskiy). 2. Starshiy zootekhnik Orlovskoy oblastnoy
kontory pchelovodstva (for Shchekin).

1ST AND 2ND LETTER																										3RD AND 4TH LETTER																										5TH AND 6TH LETTER																									
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z																										A B C D E F G H I J K L M N O P Q R S T U V W X Y Z																										A B C D E F G H I J K L M N O P Q R S T U V W X Y Z																									
<p>2</p> <p>Kulikov, N. DURABILITY OF ROTARY KILN LINING. <i>Tsimenty</i>, 3 (12) 30-31 (1935) --The importance of calculations of the influence of the thermal stress is emphasized and illustrated by examples.</p>																																																																													

1. KULIKOV, N.S., Eng.: NAZARENKO, I.I., Eng.: ZUBKOV, I.V., Eng.: CHERNITSKIY, V.S., Eng.
2. USSR (600)
4. Kilns, Rotary
7. Problems concerning the further improvement of rotary kilns.
TSement 18 No. 5, 1952.

9. Monthly List of Russian Accessions, Library of Congress, January 1953, Unclassified.

KLIKOV, N. AND OTHERS

"Contributions to the problem of perfecting rotary furnaces. p. 230, (EPITCANYAG, Vol. 5, no. 6, June 1953, Budapest, Hungary)

SO: Monthly List of East European Accessions, L.C., Vol. 2, No. 11, Nov. 1953, Uncl.

KULIKOV, N.S., inzhener

The improvement of 127m. rotary kilns. TSement 21 no.4:22-23 Ag'55
(Kilns, Rotary) (MIRA 8:11)

SHAKHBAZIAN, T.O., inzhener; KULIKOV, M.S., inzhener.

Peripheral feeding of raw material mixture to a rotary kiln.
TSement 22 no.6:13-14 N-D '56. (MLRA 10:2)
(Kilns, Rotary)

VODOLAZSKIY, G., inzh.; KULIKOV, N., inzh.

Learning to use rotary kilns equipped with conveyer calcinators.

Stroi. mat. 3 no.12:9-12 D '57.

(MIRA 11:2)

(Kilns, Rotary)

AUTHORS: Kulikov, N.S., Danyushevskiy, V.S. SOV-101-58-4-2/12

TITLE: Experiments in Selecting the Optimum Granulometric Composition of Raw Material to Be Fed Onto the Grate of a Conveyer Calcinator (Opyt podbora optimal'nogo granulometricheskogo syr'ya, podavayemogo na reshetku konveyernogo kal'tsinatora)

PERIODICAL: Tsement, 1958, Nr 4, pp 5-9 (USSR)

ABSTRACT: The authors present the results of experiments on the hydraulic resistance of granulated materials, to be fed onto the grate of the Lepol furnace. The PKB Niitsement brigade tried to determine the optimum granulometric composition by determining the following dependences: 1) Resistance of the layer versus its porosity at various thicknesses of the layer and gas velocities. 2) The degree of decarbonization of the granules versus their size. 3) The resistance of granules to cracking, versus their size. The resistance of the granulated material layer was measured by means of an apparatus shown in Figure 1. The results of the studies are given in the form of graphs. The form of curve obtained in Graph 2 was the same as one given by V. Ansel'm (according to experiments of Ramzin and Banden).

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SOV-101-58-4-2/12

Experiments in Selecting the Optimum Granulometric Composition of Raw
Material to Be Fed Onto the Grate of a Conveyor Calcinator

There are 7 graphs, 1 diagram, 3 tables and 1 Soviet reference.

1. Materials--Selection
2. Materials--Test methods
3. Calcite--Processing

Card 2/2

AKRAMOVSKIY, M.H., *Entom. obozr.*, 1964, 43, 1, 1-11, 1 fig., 1 tab., 1 map.

Treatment of European foulbrood with a culture of microbial antagonists.
Veterinaria 39 no.7:58-59 J1 '62. (MIRA 16:1)

1. Grodnenskaya oblastnaya veterinarno-lakteriobogobskaya laboratoriya.

KULIKOV, N.S.; CHEREPOV, V.T.; KHOMUTOVA, T.M.; VECHERKINA, L.G.; TIKHONOV, L.S.

Paratyphoid fever in bees. Veterinaria 41 no.8:43-44 Ag '64.
(MIRA 1844)

KULIKOV, N.T., inzh., ISAKOVSKIY, I.G.

Technical and economic indices of construction for the transportation industry. Trudy TSNIIS no. 34:5-32 '60.

(MIRA 13:8)

(Railroads--Buildings and structures)

(Earthmoving machinery)

(Labor productivity)

KULIKOV, N.V.

Works on experimental biogeocenology. Pt.2: Effect of soaking seeds
in a mixture of β -radiation emitters on the biomass and structure of
experimental phytocoenoses. Trudy Inst.biol. UFAN SSSR no 9:252-291
'57 (MIRA 11:9)

(PLANTS, EFFECT OF BETA RAYS ON)

KULIKOV, N. V.

"Effect of Uranium Fission Fragments on the Biomass and Structure of an Experimental Plant Community," by N. V. Kulikov, Ural Affiliate, Academy of Sciences USSR, Sverdlovsk, Botanicheskiy Zhurnal, Vol 42, No 3, Mar 57, p 377-394

The author describes experiments in which were studied, for one season, a plant community grown from a mixture of seed from 30 different species of cultivated plants, the seed having been treated beforehand with various concentrations of a solution of uranium fission fragments. Data on the biomass, structure, and distribution of radioactivity in the experimental plant community are presented.

The concentrations of the solutions of uranium fission fragments were 2 mc/l (first dose), 20 mc/l (second dose), and 200 mc/l (third dose).

Visual observation and a quantitative analysis of the biomass of the plant communities at various stages of their development showed that the first dose stimulated the development of the entire community to a certain extent, the increase being due to an increased number of viable plants per unit area. The second dose resulted in a decreased number of viable plants per unit area but an increase in the average weight of each plant; therefore, the total biomass of the plant community did not differ from that of the control. The third dose resulted in marked inhibition, completely destroying some species and thus resulting in a noticeable decrease in biomass.

A study of the distribution of radioactivity in the plant community showed that all species differed both in the absolute amount of radioactivity in the tissues and its distribution in the plant. However, the concentration of radioactivity was significantly higher, in all cases, in the roots than in the aboveground structures. (U)

Sum-1374

KULIKOV, N.V.

Effect of ethylenediaminetetraacetate on the behavior of cobalt
in soil and plants. Pochvovedenie no.12:89-94 D '60.(MIRA 14:1)

1. Institut biologii, Ural'skiy filial Akademii nauk SSSR.
(Soils--Cobalt content) (Plants--Assimilation)
(Acetic acid)

PORYADKOVA, N.A.; MAKAROV, N.M.; KULIKOV, N.V.

Experiments in radio stimulation of cultivated plants. Trudy Inst.
biol. UFAN SSSR no. 13:19-33 '60. (MIRA 14:1)
(Plants, Effect of radiation on)

~~KULIKOV, N.V.~~

Fall and winter accumulation of Co^{60} and its distribution in birch seedlings. Bot. zhur. 45 no.10:1549-1552 O '60. (MIRA 13:11)

1. Laboratoriya biofiziki Ural'skogo filiala Akademii nauk SSSR, Sverdlovsk.

(Plants—Assimilation)
(Cobalt)

(Birch)

KULIKOV, N.V.

Effect of sodium salt of ethylenediaminetetraacetic acid on
the behavior of radiocobalt in the soil - plant system.
Dokl.AN SSSR 133 no.3:698-701 J1 '60. (MIRA 13:7)

1. Institut biologii Ural'skogo filiala Akademii nauk SSSR.
Predstavleno akad. A.L.Kursanovym.
(COBALT--ISOTOPES) (PLANTS--ASSIMILATION) (ACETIC ACID)

KULIKOV, N. V.

Cand Biol Sci - (diss) "Action of irradiators on the phytocenosis and effect of phytocenosis on the re-distribution of radio-isotopes in soil." Sverdlovsk, 1961. 16 pp; (Ural Affiliate of the Academy of Sciences USSR, Inst of Biology); 170 copies; free; list of author's works at end of text (11 entries); (KL, 5-61 sup, 184)

KULIKOV, N.V.

How the humus content of soils affects the assimilation of cobalt by plants. Pochvovedenie no.4:78-81 Ap '61. (MIRA 14:6)

1. Institut biologii Ural'skogo filiala AN SSSR.
(Humus) (Cobalt—Isotopes) (Plants—Assimilation)

KULIKOV, N.V.; PORYADKOVA, N.A.; AGAFONOVA, S.V.; TIMOFEYEV-RESOVSKIY, N.V.

Action of radiators on phytocenoses and the effect of the latter
on the migration and redistribution of radioisotopes in soils.
Trudy Inst.biol.UFAN SSSR. no.22:31-47 '62. (MIRA 16:3)
(RADIOISOTOPES) (PLANTS, EFFECT OF RADIATION ON)
(SOILS)

KULIKOV, N.V.; TIMOFEYeva, N.A.

Accumulation of cobalt by plants as related to the content and forms
of its compounds in the soil. Pochvovedenie no.4:70-74 Ap '65.

(MIRA 18:6)

1. Institut biologii Ural'skogo filiala AN SSSR.

KULIKOV, N.V.

Effect of ethylenediaminetetra-acetate on the mobility of
the radioisotopes of strontium, cesium, and some other
elements in soil. Pochvovedenie no.6:79-83 Je '65.

(MIRA 18:11)

1. Institut biologii Ural'skogo filiala AN SSSR. Submitted
Nov. 15, 1964.

Куликов, Н. В.

Kulikov, N. V.

"The Theory, Calculation, and Scope of Application of Mine Hoist Equipment of the Ballast Type." Min Coal Industry USSR. Academy of the Coal Industry. Moscow, 1955 (Dissertation for the degree of Candidate in Technical Sciences)

SO: Knizhnaya letopis' No. 27, 2 July 1955

SOV-127-58-10-13/29

AUTHOR: N.V. Kulikov, Candidate of Technical Sciences

TITLE: The Future Use of Synthetic Materials for Mine Hoisting Operations (Perspektivy primeneniya sinteticheskikh materialov dlya rudnichnogo pod'yoma)

PERIODICAL: Gornyy zhurnal, 1958, Nr 10, pp 44-46 (USSR)

ABSTRACT: In connection with the decision of the plenary session of the Central Committee of the Communist Party in May 1958, to increase the production of artificial and synthetic materials in 1959-1965, the author describes the possibilities of the use of such materials in the mining industry. He deals with the problem of replacing steel cables by synthetic capron cables for hoisting operations in pits, and describes the advantages and defects of such cables. New kinds of synthetic fiber with greater tensile strength and with a lower stretching factor must be found.

Card 1/2

The Future Use of Synthetic Materials for Mine Hoisting Operations SOV-127-58-10-13/29

There is 1 table.

ASSOCIATION: Moskovskiy institut tsvetnykh metalov i zolota (The Moscow Institute of Nonferrous Metals and Gold)

1. Mining industry--USSR 2. Hoists--Equipment 3. Cables
--Materials

Card 2/2

KULIKOV, N.V., gornyy inzhener.

Hoisting cables made of artificial fiber. Tekst.prom. 17 no.2:
19-20 F '57. (MLRA 10:2)
(Textile fibers, Synthetic) (Rope) (Mine hoisting)

11(0)

AUTHOR: Kulikov, N.V.

SOV/93-58-11-5/15

TITLE: Plastic Pipe for Deep Well Drilling
(Ob ispol'zovani plastmassovykh trub dlya bureniya glubokikh skvazhin)

PERIODICAL: Neftyanoye khozyaystvo, 1958, Nr 11, pp 28-30 (USSR)

ABSTRACT: The author points out the advantages of plastic drill pipe to steel pipe in deep well drilling. He substantiates his conclusion with the aid of the following formula $L_r = \frac{\sigma_v}{\gamma}$, where L_r is the breaking length of the material, σ_v - the temporary resistance of the material to breaking, and γ - the volumetric weight of the material. According to this formula the breaking length of Ye steel of 75 kg/sq.mm ultimate strength is 9,550 meters, while the breaking length of glass textolite is 44,500 meters and of anid, enant, capron and of other plastic materials 60-70 kilometers (Table). Furthermore, according to the Law of Archimedes the weight of the drill pipe decreases by the weight of the drilling fluid it displaces which means that with a drilling fluid of 1.25 specific gravity the breaking length of Ye steel will amount to about 11.5 km and that of glass textolite to about 180 km. Inasmuch as the specific gravity of most plastic materials is nearly the same as that of the drilling fluids, the plastic drill pipe when submerged in the fluid becomes almost weightless. This means that the load on a string of plastic pipe will not depend on the depth of

Card 1/2

Plastic Pipe for Deep Well Drilling

SOV/93-58-11-5/15

the well and consequently facilitate the drilling of very deep wells. The editor cautions the reader not to accept these conclusions as finite since the subject of plastic materials for drill pipe must undergo further study. There is 1 table and 2 Soviet references.

Card 2/2

VINNIKOV, Il'ya Zakharovich, inzh.; FRENKEL', Mikhail Issakovich;
KULIKOV, N.V., nauchnyy red.; BASHKOVICH, A.L., red.;
SUSHKEVICH, V.I., tekhn.red.; TOKER, A.M., tekhn.red.

[Driller] Sverlovshchik. Moskva, Vses.uchebno-pedagog.izd-vo
Proftekhizdat, 1960. 198 p. (MIRA 14:3)
(Drilling and boring)

ACCESSION NR: AP4009835

S/0191/64/000/001/0052/0054

AUTHOR: Nikolayev, A. N.; Yartsev, V. G.; Kulikov, N. V.; Vitenberg, A. R.; Matveyeva, Ye. A.; Ter-Mkrtchan, G. S.; Naumova, V. V.

TITLE: Glass plastics for constructional purposes

SOURCE: Plasticheskiye massy*, no. 1, 1964, 52-54

TOPIC TAGS: plastics, glass plastics, binders, polyester, resin PH-1, epoxy resins, styrene, glass lubricants, glass fillers, plastic tubes, hexamethylenediamine, metaphenylene diamine

ABSTRACT: A very simple and effective technological process for the continuous manufacture of shaped products from glass plastics is described. The products obtained on the stretching apparatus are characterized by high strength and can be applied in various industrial fields. The relationship between the hardeners and the processibility of resin on the continuous apparatus is investigated for a styrene-epoxide compound at a hardening temperature of 140 C. The properties of the styrene-epoxide compound with different hardeners

Card 1/2

ACCESSION NR: AP4009835

are tabulated. The influence of new lubricants, As-1, AF-1, PVE, PVE-3, on the strength of glass plastic was investigated. The relationship between the strength of glass plastic pipes under axial compression and the glass filler content is established. Suggestions for the best choice of binders, lubricants and fillers are given. Glass plastic rods of small diameter made on the continuous machine have a high breaking strength similar to the strength of steel cables. Orig. art. has: 2 tables.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 10Feb64

ENCL: 00

SUB CODE: CH, MA

NO REF SOV: 000

OTHER: 000

Card 2/2

L 10385-63 EFR/ENT(j)/EFF(c)/ENT(m)/BDS/ES(v)--AFFTC/ASD--Ps-4/
 Pc-4/Pr-4/Pe-4--RM/WH/MAY/WW
 ACCESSION NR: AP3000398

S/0191/63/000/005/0026/0032

AUTHOR: Kulikov, N. V.

TITLE: Effect of the angle of filament winding on the hermetic state of
glass-fiber-reinforced tubing

SOURCE: Plasticheskiye massy, no. 5, 1963, 28-32

TOPIC TAGS: filament-wound tubing, direction of winding, glass-fiber-reinforced
 plastics, hermetic state, strength, stiffness

TEXT: Experimental results are given of the effect of angular direction of
 the filament winding on the hermetic state of glass-fiber-reinforced tubing.
 It was determined that the angle between the direction of filament winding
 and the axis of the tubing affects considerably the strength, deformation,
 hermetic state, creep, and other properties of filament-wound tubing. As a
 result of tests under hydrostatic pressure of nitrogen, a network of cracks
 directed along the filament appears on the surface of such tubing and the
 tubing loses its hermetic state under a stress equal to only one third of

Card 1/2

L 10385-63

ACCESSION NR: AP3000398

2

the tensile strength of glass-fiber-reinforce plastics. These tests confirmed the hypothesis of Davidenkov and Fridman according to which failure is caused by principal stresses along the so called weak planes oriented along the fiber. Therefore, the direction of filament winding should coincide with the direction of principal stresses, resulting thereby in maximum strength, stiffness, and hermetic state in both short-time and stress-rupture tests. For a complex state of stress with stress concentration present, the filament wound tubing should consist of a number of alternate layers of filament wound along, perpendicularly, and under a 45° angle to the axis of the tubing; the thickness of layers is determined by the magnitude of stresses in these directions.

"I. P. Berkovich and L. A. Luk'yanchikova took part in the work." Orig. art. has: 3 figures, 3 tables, and 7 formulas.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 10Jun63

ENCL: 00

SUB CODE: 00

NO REF SOV: 004

OTHER: 001

ph/ps
Card 2/2

S/193/60/000/005/008/012
A001/A001

AUTHOR: Kulikov, N.V.

TITLE: The Electromotors of the Atomic Icebreaker "Lenin"

PERIODICAL: Byulleten' tekhniko-ekonomicheskoy informatsii, 1960, No. 5, pp. 60- 62

TEXT: The atom-powered icebreaker "Lenin" has three powerful propeller electromotors, one of the 2 MN19600-150 (2MP19600-150) type for the middle shaft screw of 19,600 hp, 1,200 v on armature and 150/195 rpm, and two 2 MN9800-150 (2MP 9800-150) electromotors of 9,800 hp. each, 1,200 v on armature and 150/215 rpm for the side screws. The total power of the electromotors of the atom-powered icebreaker "Lenin" at a rated load amounts to 39,200 hp. The electromotors are supplied from eight dc turbogenerators of the two-rotor type, having a power of 2 x 1,920 kw each. The propeller electromotors of the icebreaker are able to operate under heavy-duty conditions, e.g. at high temperatures of the surrounding air up to $\pm 40^{\circ}\text{C}$ and high relative humidity up to 98%, during pitching and rolling and frequent vibrations, at an overload exceeding 10% of the rated current for two hours and an overload of 50% for two minutes. The table presents some technical data of the propeller electromotors, which combine a high efficiency with minimum

Card 1/3

The Electromotors of the Atomic Icebreaker "Lenin"

S/193/60/000/005/008/012

AOO4/AOO1

overall dimensions.

1) Фирма или завод	2) Тип электродвигателей	3) Мощность, л. с.	Ско-4) рость вращения, об/мин	5) К п. л.	6) Общий вес, т	7) Момент вращения
8) "Электросила"	2МП 19600-150	2×9800	150/195	95,3	178	93,50
9) То же	2МП 9800-150	2×4900	150/215	94,5	103	46,75
10) Сименс-Шуккерт* (ФРГ)		2×5500	115/145	94,0	193	68,5
11) То же		5500	115/145	91,0	96,5	34,25

Table: 1) producer firm or plant; 2) type of electromotors; 3) power, hp; 4) rotation speed, rpm; 5) efficiency, %; 6) total weight, tons; 7) torque; 8) "Elektrosila"; 9) idem; 10) Siemens-Schuckert* (German Federal Republic); 11) idem.

* on the icebreaker being built in Finland for the Soviet Union, four electromotors of 5,500 hp each are installed, two of which are flanged to each other, driving the middle propeller shaft, while two are driving the side propeller shafts.

Up to 150 rpm the rotation speed of the electromotors is controlled by varying the voltage supplied to the armature at rotation speeds exceeding 150 rpm the

Card 2/3

The Electromotors of the Atomic Icebreaker "Lenin"

S/193/60/000/005/008/012
A004/A001

control is effected by weakening the magnetic flux of the main poles. Electromotors and propeller shafts are rigidly coupled. Two armatures are put on the common shaft of each electromotor, which has two antifriction bearings with forced lubrication. The friction surface of the bushes is lined with \bar{b} -38 (B-83) babbitt. The propeller electromotors have a forced cooling system. Two axial electric fans on the 2MP 19600-150 motor supply it with 40 cu.m/sec air, while two centrifugal fans deliver 20 cu.m/sec air to each of the 2MP 9800-150 electromotors. The air heated in the motors passes through water coolers fed with outboard water at a rate of 90 cu.m/h (for the 2MP 19600-150 electromotor) and 60 cu.m/h (for the 2MP 9800-150 electromotors). There is 1 figure and 1 table.

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Card 3/3

5(1), 5(2)

AUTHOR:

Kulikov, N. Ye.

SOV/153-2-3-18/29

TITLE:

A New Technology for the Production of Liquid Carbon Dioxide
by the Method of Compression

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya
tekhnologiya, 1959, Vol 2, Nr 3, pp 399-405 (USSR)

ABSTRACT:

On the basis of comparative investigations it was found that it is suitable to use the waste gases of lime kilns, which contain more carbon dioxide and which are more widely used than the industrial bicarbonate plants. This considerably raises the productivity of the apparatus and reduces the production costs of carbon dioxide by more than one third. The author developed a new industrial method for the production of commercial liquid carbon dioxide in a semi-industrial experimental plant. The experimental plant is schematically represented in figure 4 and exactly described. The method is based on the direct separation of liquid carbon dioxide from gas mixtures with a composition similar to that of the waste gases of lime kilns. A comparison of this new technology with the bicarbonate method which is the most widely used for the industrial production of liquid

Card 1/3

SOV/153-2-3-18/29

A New Technology for the Production of Liquid Carbon Dioxide by the Method of Compression

carbon dioxide shows that the first has greater advantages. The most important advantages of the new method are the following: a) The technological scheme for the production of liquid carbon dioxide is very simplified and meets the industrial requirements for large-scale production. b) The production costs of liquid carbon dioxide computed from the consumption in the production are by 50% and 75% lower, the consumption of steam and electrical energy is by 7/9 - 7/8 lower and also other technical and economic factors are more favorable. c) The output is higher at the same working consumption and the sanitary and hygienic conditions in the production are much better. Figure 5 shows schematically the course of the production of liquid carbon dioxide from waste gases of lime kilns by compression. Table 1 shows the most important technical and economic data in the production of liquid carbon dioxide by the bicarbonate absorption method. Table 2 gives a survey on the most important technical and economic factors in the production of liquid carbon dioxide by compression of the waste gases of lime kilns. Table 3 shows a comparison of the tech-

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SOV/153-2-3-18/29
A New Technology for the Production of Liquid Carbon Dioxide by the Method of Compression

nical and economic data of plants operating according to the bicarbonate method and of plants operating with compression. N. P. Matin and V. V. Morozova participated in the experimental work. There are 5 figures, 3 tables, and 2 references, 1 of which is Soviet.

ASSOCIATION: Gor'kovskiy politekhnicheskii institut imeni A. A. Zhdanova
Kafedra protsessov i apparatov i obshchey khimicheskoy
tekhnologii (Gor'kiy Polytechnic Institute imeni A. A. Zhdanov,
Chair for Processes and Apparatus and General Chemical Technology)

SUBMITTED: February 18, 1958

Card 3/3

KULIKOV, O.

Banking system of the Indonesian Republic. Den. 1 kred. 16 no.10:88-93
0 '58. (MIRA 11:11)

(Indonesia--Banks and banking)

KULIKOV, O.

Nationalization of Dutch banks in Indonesia. Den. 1 kred. 17
no.3:88-92 Mr '59. (MIRA 12:4)
(Indonesia--Banks and banking)

KULIKOV, O.

Agricultural credit in Indonesia. Den.i kred. 17 no.10:
66-74 0 '59. (MIRA 12:12)
(Indonesia--Agricultural credit)

KULIKOV, O.

Foreign trade regulation in Indonesia [with English summary in
supplement]. Vnesh. tog. 29 no.5:22-24 '59. (MIRA 12:6)
(Indonesia--Foreign trade regulation)

KULIKOV, O.

Monetary system of Indonesia. Den. i kred. 18 no. 8:72-78
Ag '60. (MIRA 13:7)
(Indonesia—Money)

ADERIKHIN, A.S.; AR'KOV, V.G.; BAGROV, K.I.; SALIMON, V.S.; KULIKOV, O.A.

Mechanical building-up of metal cutting tools. Biul.tekh.-ekon.
inform.Gos.nauch.-issl.inst.nauch.i tekhn.inform. 16 no.8:25-27
'63. (MIRA 16:10)

Handwritten: A. A. 1956
KOROLEV, F.A.; KULIKOV, O.F.

Detecting the isotope He^3 in a natural mixture of helium isotopes
by optical means. Vest.M_osk.un. Ser.mat.,mekh.,astron.,fiz.,khim.
11 no.1:95-101 '56. (MIRA 10:12)

1. Kafedra optiki Moskovskogo universiteta.
(Helium--Isotopes) (Spectrum analysis)

KULIKOV, O.F.

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1645
AUTHOR KOROLEV, F.A., MARKOV, V.S., AKIMOV, E.M., KULIKOV, O.F.
TITLE The Experimental Investigation of the angular Distribution and Polarization of the Optic Radiation of Electrons in a Synchrotron.
PERIODICAL Dokl. Akad. Nauk, 110, fasc. 4, 542-544 (1956)
Issued: 12 / 1956

This work aims at the experimental verification of the conclusions drawn by D.D. IVANENKO and A.A. SOKOLOV (Klassiceskaja teorija polja, 1949) from the theory of the "luminescent electron". The work was carried out in 1955 by means of the electron synchrotron of the laboratory of V.I. VEKSLER. Various theoretical works are cited.

The optic device developed by the authors permits the study of the angular distribution of the radiation of electrons in a synchrotron. It is suited for the investigation of components the electric vector of which is parallel or vertical to the orbital plane (σ -component and π -component respectively). The apparatus contains the necessary polarization devices. Radiation was photographically recorded and pictures were utilized by photographic photography. Radiation is emitted through a special window from the chamber of the synchrocyclotron. Investigation was carried out in the visible domain of the spectrum by the elimination of certain regions by means of an interference light filter the transmissivity band of which has a width of $\sim 100 \text{ \AA}$. Numerous photographs of the angular distribution of the radiation intensity were

Dokl.Akad.Nauk, 110, fasc.4, 542-544 (1956) CARD 2 / 2

PA - 1645

obtained for the various components of polarization on the occasion of the acceleration of the electrons to various energies. Photographs of the σ - and π -components and microphotographs of the former are attached. A further diagram illustrates the intensity distribution of the π - and σ -components. The wavelength $\lambda = 4080 \text{ \AA}$ denotes the maximum of the transmissivity band of the interference light filter. The theoretical curves were plotted on the basis of the aforementioned book for 250 MeV and $\lambda = 4000 \text{ \AA}$, and the experimental curves were plotted in accordance with the results of photometrization. Experimental and theoretical data show satisfactory agreement. The intensity among the maxima of π -component, which differs from zero, can be explained by betatron oscillations and by the inaccurate setting-up of the optic system. The intensity of the π -component is several times weaker than that of the σ -component, which is in agreement with theory. The dependence of the angular distribution of intensity on the energy of the electrons is confirmed in agreement with the theory by photographic recordings. Furthermore, also an elliptical polarization was qualitatively determined. More accurate investigations of these effects within a wide spectral range are being carried out.

INSTITUTION: Moscow State University.

KOROLEV, F.A.; AKIMOV, Ye.M. [deceased]; MARKOV, V.S.; KULIKOV, O.F.

Experimental investigation of optical emission by electrons in
a synchrotron with an energy of up to 270 Mev. Fiz.sbor. no.4:
24-28 '58. (MIRA 12:5)

1. Fizicheskii fakul'tet Moskovskogo ordena Lenina i ordena
Trudovogo Krasnogo Znameni gosudarstvennogo universiteta
imeni M.V.Lomonosova.
(Electrons) (Synchrotron)

66601

SOV/139-59-3-14/29

21,2200

AUTHOR: Kulikov, O.F.

TITLE: Calculation of the Energy of Polarized Emission from a
"Radiating" Electron

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika,
1959, Nr 3, pp 95-101 (USSR)

ABSTRACT: Formulae are derived which may be used in the numerical calculation of the energy of polarized electromagnetic radiation emitted by electrons accelerated in a synchrotron in the case when the energy of the accelerated particle changes continuously according to a sinusoidal law. Schwinger has carried out a similar calculation (cf Ref 2) but his calculation did not take polarization into account. This is necessary if the theoretical results are to be compared with experiment. The calculation is based on formulae derived by Sokolov and Ternov in Ref 1. A numerical calculation has been carried out of the power per 1 Å in a wide spectral region (9000-3000 Å) for three values of maximum electron energy (250, 200 and 150 MeV). Fig 2 shows the spectral dependence of the energy of the σ -component of the polarized radiation averaged over the acceleration cycle.

Card 1/2

66601

SOV/139-59-3-14/29

Calculation of the Energy of Polarized Emission from a "Radiating"
Electron

Fig 3 shows the spectral dependence of the energy ratio
for the two components averaged over the acceleration
cycle (the symbols are defined in Ref 3).

Acknowledgements are made to A.V. Luk'yanov, G.A.
Samoylova, T.M. Cherkassova, A.I. Pentegova and
T.P. Baranova of the Computer Unit of the Moscow State
University. Candidate of Physico-Mathematical Sciences
I.M. Ternov is thanked for reading the manuscript and
for valuable suggestions.

Card
2/2

There are 3 figures and 5 references, of which 3 are
Soviet and 2 English,

ASSOCIATION: Moskovskiy gosuniversitet imeni M.V. Lomonosova
(Moscow State University imeni M.V. Lomonosov)

SUBMITTED: June 11, 1958

✓

68306

07/51-8-1-1/60

24,6600

AUTHORS: Korolev, F.A. and Kulikov, O.F.

TITLE: Investigation of the Ratio of Intensities of the Polarized Components of Radiation Emitted by a "Luminous" Electron γ

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 1, pp 3-7 (USSR)

ABSTRACT: Electromagnetic radiation of electrons accelerated (e.g. in synchrotrons) was considered theoretically by Ivanenko and Pomoranchuk in 1944 (Ref 1). Classical theory predicted that the spectrum of radiation emitted by accelerated electrons consists of closely spaced lines with frequencies $\omega_n = nc/R$, where n is an integer, c is the electron velocity along an orbit in an accelerator and R is the radius of that orbit. The amount of energy radiated by such an electron in a unit time is proportional to the fourth power of its kinetic energy. The frequency at which a maximum in the spectrum occurs is proportional to the third power of the kinetic energy. For electron energies greater than 30-50 MeV the frequency at which the maximum occurs, lies in the visible region, i.e. the radiation can be observed visually (hence the name: "luminous" electrons). The electron radiation is polarized, i.e. the electric vector is either parallel to the magnetic field and perpendicular

Card 1/3

68306

50-51-5-1-1/40

Investigation of the Ratio of Intensities of the Polarized Components of Radiation
Emitted by a "Luminous" Electron

to the electron velocity (π -component) or it is perpendicular to both the magnetic field and the electron velocity (σ -component). Each of these components has a characteristic angular distribution of intensity. The total intensity of the σ -component is greater than the total intensity of the π -component; the ratio of these total intensities should be equal to 7 (Ref 16). The present authors measured the ratio of intensities of the polarized components as a function of wavelength between 6000 and 4000 Å using 150, 200 and 250 MeV electrons. The electrons were accelerated in a synchrotron at the Physics Institute of Acad. Sci. U.S.S.R. (FIAN 303R) which could produce electrons with energies up to 280 MeV. The optical part of the apparatus (Fig 1), consisted of a quartz spectrograph ISP-23 with a Wollaston prism (B) placed between a collimator mirror (O₂) and a Cornu prism (Π) of the spectrograph. A typical spectrogram is given in Fig 2, where 1 denotes the iron spectrum used for wavelength calibration, 2 denotes the spectrum of an incandescent lamp used for intensity calibration, 3 and 4 denote the spectra of the π - and σ -components of 250 MeV electrons. Because of its low dispersion the optical system failed to resolve individual lines and, therefore, radiation of "luminous" electrons appears as a continuous spectrum in Fig 1. Spectrograms were analysed

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68306

SOV/51-8-1-1/40

Investigation of the Ratio of Intensities of the Polarized Components of Radiation
Emitted by a "Luminous" Electron

with a microphotometer MF-4; typical angular intensity distributions of the σ - and π -components at 6000 Å are shown in Fig 3 for 250 MeV electrons. A planimeter was used to measure areas under curves of the type shown in Fig 3 and the ratios I_σ/I_π at a given wavelength were obtained. The values I_σ/I_π represent the ratios of the sums of radiation emitted by electrons from the moment of injection until a given maximum energy was reached. These ratios are shown as functions of wavelength (6000-4000 Å) in Figs 4 and 5. The dots and crosses represent experimental points found as described above and continuous curves are theoretical dependences taken from the work of Sokolov and Ternov (Ref 13) and of Kulikov (Ref 14). Experiment and theory agree well for the three maximum electron energies employed: 150 MeV (curve 1, Fig 4), 200 MeV (Fig 5) and 250 MeV (curve 2, Fig 4). Acknowledgments are made to M.S. Rabinovich and A.Ya. Belyak for their help in carrying out the experiments. There are 5 figures and 16 references, 11 of which are Soviet and 5 English.

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SUBMITTED: 25 April, 1959

Kulikov, O. F.

S/020/60/133/03/03/013
B019/B056

AUTHORS: Yershov, A. G., Korolev, F. A., Kulikov, O. F.,
Shkurskiy, B. I.

TITLE: Experimental Investigations of the Compression of the
Electron Cluster in a 280-Mev Synchrotron /9

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 3,
pp. 554 - 557

TEXT: In the present paper, a new method of studying the cross section of the electron cluster in acceleration is suggested, and several experimental results concerning the compression of the electron cluster are given. The experiments were carried out on the synchrotron of the Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Institute of Physics imeni P. N. Lebedev of the AS, USSR). Several formulas for calculating the betatron oscillations are mentioned and discussed. When carrying out the experiments the electron radiation in a porcelain chamber was observed through a window and photographed by means of a motion-picture camera. The blackening of the pictures was measured by means of a microphotometer,

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Experimental Investigations of the
Compression of the Electron Cluster in a
280-Mev Synchrotron

S/020/60/133/03/03/013
B019/B056

and Fig. 1 shows the photograph of an electron cluster and the results of measurement. The elliptical shape of the cluster corresponds to the cross section of the chamber of the accelerator. In Fig. 2 the experimental results are compared with the theoretical calculations of the dependence of the relative amplitudes of the oscillation types on the duration of acceleration. It is found that the radial dimension of the cluster of the accelerated electrons decreases rapidly according to the adiabatic law. Besides, the center of the cluster is compressed more rapidly than the peripheral parts. The perpendicular diameter of the cluster decreases approximately according to the adiabatic law. Further experiments showed that the compression of the electron cluster in a progressive electron drift is the same as when no premeditated drift of the electrons exists. The authors thank M. S. Rabinovich, Doctor of Physical and Mathematical Sciences, and Professor P. A. Cherenkov for making work on the accelerator possible. There are 2 figures and 7 references: 6 Soviet and 1 American.

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Experimental Investigations of the
Compression of the Electron Cluster in a
280-Mev Synchrotron

S/020/60/133/03/03/013
B019/B056

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

PRESENTED: March 5, 1960, by N. N. Bogolyubov, Academician

SUBMITTED: March 2, 1960

✓C

Card 3/3

KULIKOV, O. F., Cand Phys-Math Sci -- "Optical radiation of electrons in a synchrotron." Mos, 1961 (Acad Sci USSR. Phys Inst im P. N. Lebedev). (KL, 4-61, 183)

-21-

KOROLEV, F.A.; YERCHOV, A.G.; KULIKOV, O.P.

Investigating variations in the axial and radial dimensions of an electron cluster in synchrotron acceleration.

Zhur. eksp. i teor. fiz. 40 no.6:1644-1652 Je '61.

(MIRA 14:8)

1. Moskovskiy gosudarstvennyy universitet.

(Photogrammetry)

(Electron beams)

(Synchrotron)

S/908/62/000/000/008/008
B163/B180

AUTHORS: Korolev, F. A., Yershov, A. G., Kulikov, O. F.

TITLE: Experimental investigation of the electron oscillations in the 680 Mev synchrotron

SOURCE: Uskoritel' elektronov na 680 Mev; sbornik statey. Ed. by Z. D. Andreyenko. Moscow, Gosatomizdat, 1962. 75-87

TEXT: The radiation of relativistic electrons with energies above 100 Mev can be directly observed or photographed, through an optical sight glass in the vacuum chamber. The system uses a mirror inside the chamber, for observation in the direction of the beam axis. With the high-speed camera CKC-1 (SKS-1), 150 to 4000 frames can be shot per second. A series of photographs, shows that at 100 Mev the beam has a slightly elliptic cross section with the major axis in the radial direction. When about 185 Mev is reached the second acceleration stage begins, and strong radial synchrotron oscillations appear, greatly increasing the radial major axis, while the beam cross section becomes dumbbell-shaped rather than elliptic. With increasing energy, the damping of synchrotron and betatron

Card 1/2

Experimental investigation of the ...

S/908/62/000/000/008/008
B163/B180

oscillations causes contraction, and the minimum radial cross section is found at 433 Mev, and 506 Mev for the vertical cross section. In the last stage the beam cross section is slightly increased again. The mean square radial and axial oscillation amplitudes were determined from the photographs, and compared with theoretical predictions. The theory of Kolomenskiy and Lebedev, which takes radiation damping into account, is found to be in good agreement with the experiment. Slight deviations are due to the experiments being made in a real synchrotron, while the theory assumes an ideal one. One reason for the undamped axial oscillations may be the warping of the magnetic symmetry plane in the real synchrotron with consequent amplification of axial oscillations under the influence of the quantum excitation of radial oscillations. Synchrotron oscillations appearing in between the first and second acceleration stages are damped more slowly than predicted. This may be because the theory assumes small amplitudes, while they are actually comensurate with the range of stability. The predicted radiation damping of electron oscillations and excitation of radial synchrotron and betatron oscillations by quantum fluctuations of the electron radiation at high energies are at any rate confirmed experimentally. There are 8 figures.

Card 2/2

S/056/62/042/006/006/047
B104/B102

AUTHORS: Kulikov, O. P.. Shoshin, P. B.

TITLE: An experimental investigation of the dimensions of an electron bunch during special operating conditions of a synchrotron

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 6, 1962, 1461 - 1463

TEXT: The variation in the amplitude of electron oscillation of a bunch during the increasing and the decreasing part of the magnetic cycle was investigated with the C-25 (S-25) synchrotron of the FIAN im. P. N. Lebedeva (FIAN imeni P. N. Lebedev). The maximum electron energy was 274 Mev. The duration of the hf pulse fed to the synchrotron resonator and the period that the electron was within the accelerating chamber were $1\frac{1}{2}$ times those under normal conditions. The electron beam was photographed with an CKL-1 (SKS-1) high-speed cinecamera. The intensity of the bunch luminescence was determined from bunch photographs by means of an ME-4 (MF-4) microphotometer. The amplitudes of radial oscillations of the bunch during the de-
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An experimental investigation...

S/056/62/042/006/006/047
B104/B102

creasing part of the magnetic cycle differed from calculated values.
Shortcomings of the synchrotron and the interaction of the bunch with the
synchrotron resonator produce the divergence. There are 2 figures.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: January 22, 1962

Card 2/2

S/056/62/043/005/014/058
B102/B104

AUTHORS: Korolev, F. A., Kulikov, O. F., Yarov, A. S.

TITLE: Investigation of polarization properties of synchrotron radiation from high-energy electrons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 5(11), 1962, 1653-1656

TEXT: The synchrotron radiation emitted by electrons from the 680-Mev electron accelerator of the FIAN was investigated cinematographically ((K⁻¹ -1 (SKS-1) camera, 500 frames per sec). The relative intensities and the angular distributions of the radiation were determined for both polarization components (σ, π) of the radiating electrons. The latter were obtained after microphotometric treatment of the pictures from representations of both components in a direction corresponding to the vertical (the angular distributions in the horizontal plane were very much distorted). The experimental results were compared with theoretical data from Sokolov's formulas (cf. A. A. Sokolov, Vvedeniye v kvantovuyu elektrodinamiku - Introduction to quantum electrodynamics-, Fizmatgiz, Card 1/3

Investigation of polarization ...

S/056/62/043/005/014/058
B102/B104

1958, (28) and agreed well except for the π -component at small electron energies (cf. Fig. 1): the 90° minimum that should exist according to theory was not observed, and in no case did the minimum reach zero as it should. As could be shown by measurements of the intensity ratios $I_{\pi}^{\min}/I_{\pi}^{\max}$ over the whole cycle, the absence of a zero minimum can be attributed to axial vibrations of the electrons. The angular distributions as well as the polarization characteristics observed agree with those found by A. A. Sokolov and I. M. Ternov (ZhETF, 31, 473, 1956). There are 3 figures and 1 table.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: June 21, 1962

Fig. 1. Angular distributions of intensities of σ - and π -components of radiation at different instants of acceleration for $\lambda = 4360\text{\AA}$.
Solid lines: calculations according to Sokolov; I given in relative units.

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Investigation of polarization ...

S/056/62/043/005/014/058
B102/B104

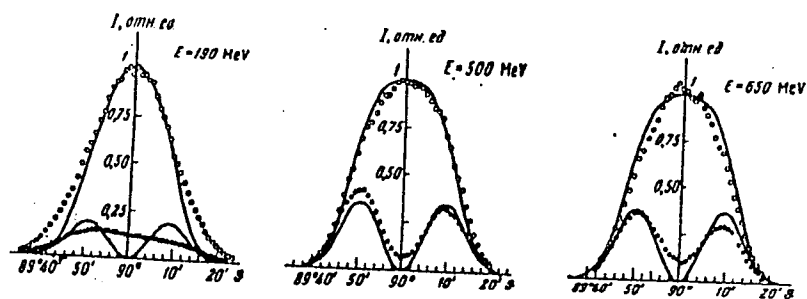


Fig. 1

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KOROLEV, F.A.; KULIKOV, O.F.; YAROV, A.S.

Polarization properties of synchrotron radiation emitted by
high-energy electrons. Zhur. eksp. i teor. fiz. 43
no.5:1653-1656 N '62. (MIRA 15:12)

1. Moskovskiy gosudarstvennyy universitet.
(Electrons) (Synchrotron)

AUTHOR: Kulikov, O. F.; Tel'nov, Yu. Ya; Filippov, Ye. I.; Yakimenko, M. N.

Compton effect on moving electrons

Experimental investigation of the Compton effect on moving electrons, *Phys. Lett.*, 1964, 1591-1594

by a ruby laser with an output pulse of 0.5 joule, with a beam of elec-

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